

California Academy of Sciences Annual Report 2001–2002



STEINHART AQUARIUM • NATURAL HISTORY MUSEUM • MORRISON PLANETARIUM
EDUCATION • RESEARCH

A Letter from the Director

J. Patrick Kociolek, Ph.D. *Director, California Academy of Sciences*

This has been a tremendously exciting year organizing for three giant tasks ahead of us. The first, chronologically, is to celebrate the Academy's 150th Anniversary in 2003. We are preparing a large-scale exhibit that will occupy two major halls in the Museum and highlight our history, innovations, collections and achievements. We are also planning a series of special events, including a festival in the Golden Gate Park Concourse to which everyone is invited.

While the Academy staff have been devoting much of their time to this exhibit, I have been concentrating on the enormous enterprise that will follow, namely overseeing the design and content of a new Academy to be built on our current site in Golden Gate Park. And, concurrently, arranging for a transition Academy to which staff, collections, and exhibits, including the live animals, will move in the interim.

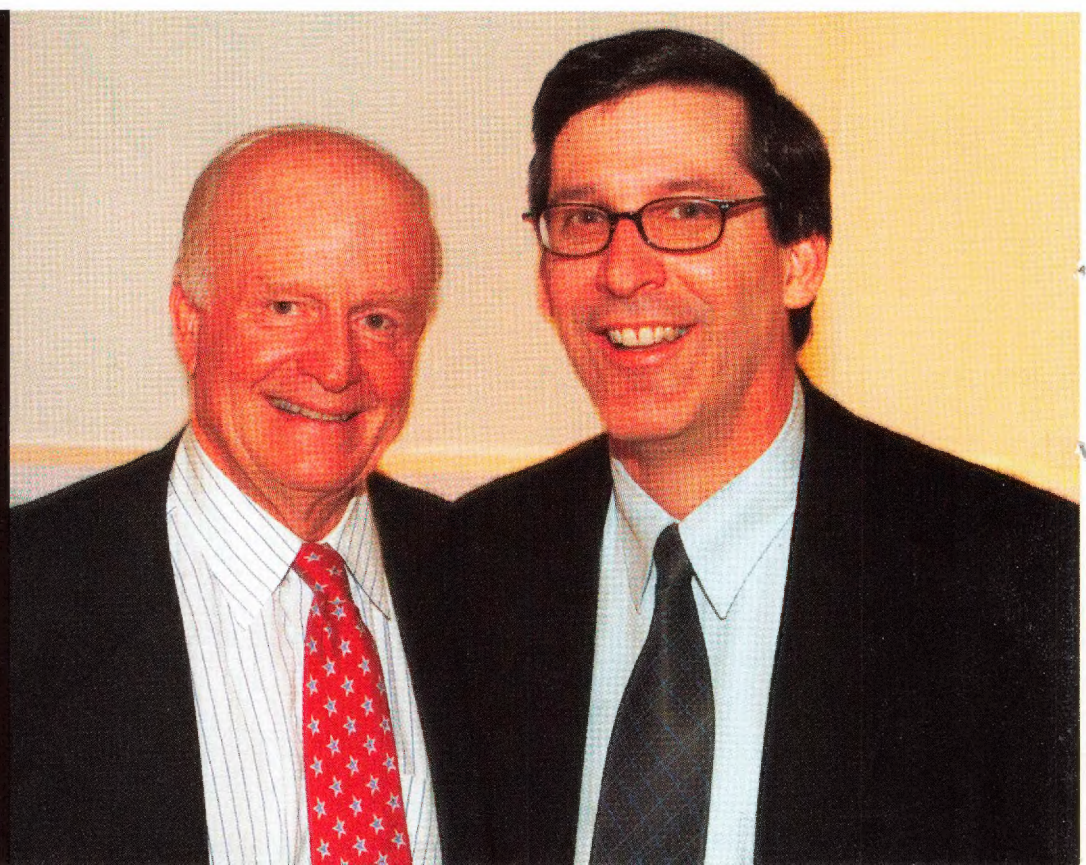
While planning for the new Academy has been proceeding for quite some time, the need to rebuild the facility becomes more urgent with each passing month. The Academy, consisting of twelve buildings that have endured varying degrees of earthquake damage and years of wear and tear, is no longer capable of supporting our evolving scientific research. Nor are the public spaces at the standard of excellence required to serve our visitors. But there are two far more fundamental reasons, two social imperatives that explain why a new, vibrant, up-to-date Academy is essential. The first is the growing crisis occurring in the natural world. The areas above and below the public floor where the collections are stored are woefully inadequate for our current, let alone future needs. The Academy is one of the few institutions in the country dedicated to preserving the evidence of biodiversity. As other establishments in the West with different priorities and limited resources choose to divest themselves of their collections, it is to the Academy they turn. Our collections are approaching 18 million individual specimens and artifacts and are growing more rapidly with each year. From these specimens, and with the help of modern technology, we are able to map the distribution of species, fine tune their habitat requirements, and determine those critical areas of the world that need conserving.

The second social imperative is created by another crisis: the standard of science education in the state and the country, a crisis, given the condition of California's economy, likely to grow more severe in the near future. The Academy is in a position to concentrate its considerable scientific and educational resources to capture the imagination of our youth, and inculcate within them a fascination for science. That is the heart of our mission and motivates each decision we make as we plan for the new Academy.

Come with us during this exciting journey and become a part of this most important adventure.



Left: Patrick Kociolek, director of the California Academy of Sciences with Renzo Piano, architect for the new Academy. Right: Dr. Kociolek and W. Richard Bingham, chair of the board of trustees.



A Letter from the Chair of the Board of Trustees

W. Richard Bingham, Chair, *California Academy of Sciences*

Few San Francisco institutions have the longevity, reputation and impact of the California Academy of Sciences. Founded in the nineteenth century, it has served millions of families in the twentieth century, and is entering the twenty-first century with a new vision for education, scientific research, interactive exhibits and exceptional programming housed in a new facility that will be an environmental achievement in itself.

For the past four years, the board and staff of the Academy have been engaged in thoughtful and extensive planning for the rebuilding of the Academy. We are off to a great start in our effort to raise the remaining funding needed to renew one of San Francisco's greatest public treasures. We enter our 2003 fiscal year with confidence that our longtime friends and supporters will help us finance and execute the largest and most far-reaching cultural project in the history of San Francisco.

But the vision for our future is best understood by reflecting on the past.

For a century and a half, since its founding in 1853, the California Academy of Sciences has offered families a place to learn about the wonders of nature. During that time, we have been great innovators of both ideas and technology.

In 1884, Rosa Smith Eigenmann became the first female ichthyology curator in the world. James Blake, an early Academy member, revolutionized winemaking when he invented malolactic fermentation, now used in wineries around the globe. In the 1950s, "Science in Action", broadcast live, brought natural science programming to a television audience for the first time. And in the 1980s, the "Life Through Time" exhibit introduced interactive computers to museum displays.

These are but examples of our many innovations—all the while being open 365 days a year and providing the opportunity to San Franciscans and visitors alike to explore and learn, under one roof, about Earth, Ocean and Space.

Today, through exhibits, public programs, educational classes, and research here at home and abroad, the Academy examines the complexities of peoples, cultures, and the natural environment in which we all live. By building bridges between generations and cultures, and an awareness of the world around us, the Academy creates bonds that tie our community closer together.

Since 1995, San Francisco voters have twice approved bond measures to help rebuild the Steinhart Aquarium and the rest of the Academy. Combined with the generosity of the Bay Area's vital philanthropic community, as well as corporations and foundations, the Academy is poised to enhance its role as the leading institution in California and west of the Mississippi for exhibition, education, conservation, and research about the natural world. The need for science education and the awareness of our environment and its fragility, as well as the urgency of protective measures, is greater than ever before.

Our facilities are no longer able to safely house the exhibits, marine life, educational programs, and staff necessary to accomplish our mission. Building a new home in Golden Gate Park while also improving our exhibits, expanding our innovative educational programs, and continuing world-class scientific research is essential for the Academy to continue to be a vital part of the Bay Area community.

The Academy of tomorrow will be an Academy for the twenty-first century and beyond. It will be built on the values, principles, and programs that have served the people of San Francisco and the world since 1853, while providing scholars, school children, families, and those who come in wonder and curiosity with an experience that will be twenty-first century in its innovation, excellence, and impact.

The Academy appreciates the support—philosophical and financial—it has received over the years. We invite our friends to continue that support and join our quest to fulfill the vision of the new Academy.

The year began with a fire. On August 29th, around midnight, a fire broke out in the Academy store. Two weeks later the World Trade Center was destroyed. The following day we learned about the tragic death of herpetologist curator Joseph Slowinski who was leading an Academy expedition in northeast Myanmar. It was a difficult time for the country and the Academy.

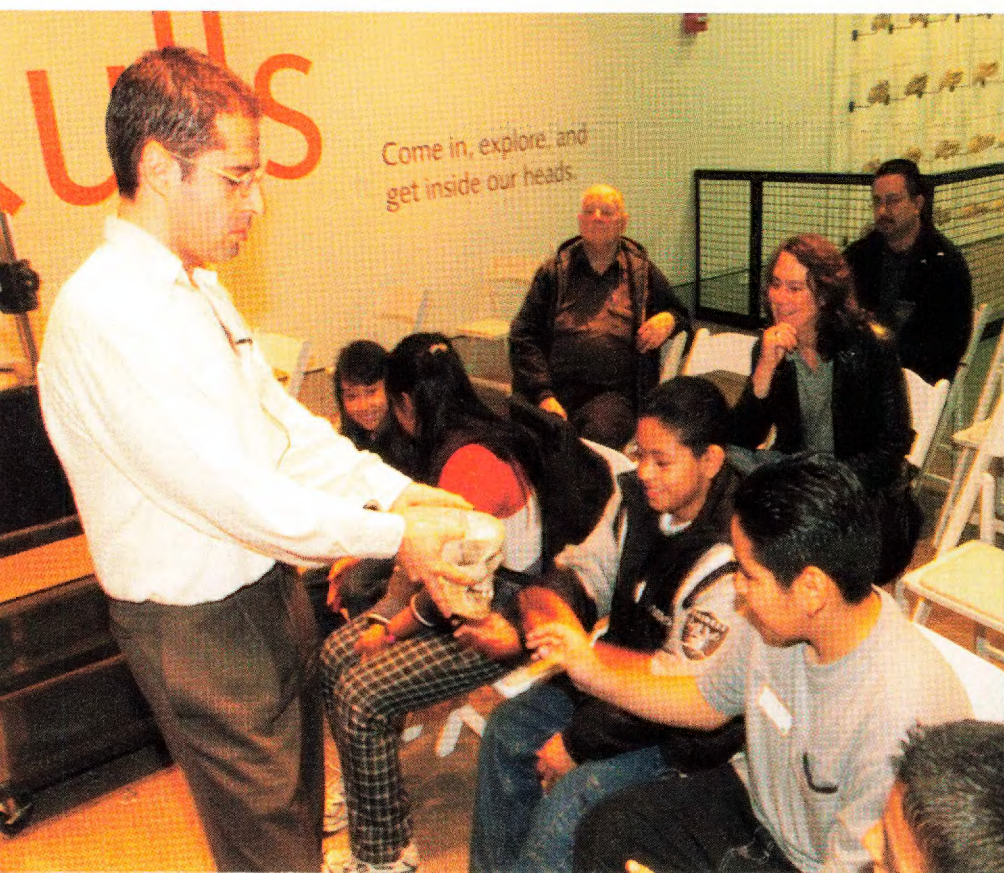
I think that what struck us about the fire was how much damage took place on our public floor. At first blush it didn't seem that serious, but when we began to see the extent of the smoke and water damage we realized the whole institution had suffered enormously. We were challenged by the clean up and, with the main corridor to the Aquarium inaccessible, arranging access to the exhibits. I met a guy in a wheelchair near the Swamp and asked him how he got there. He had gone all the way around the periphery of the institution. "I wouldn't miss seeing the Steinhart Aquarium during a visit regardless of how difficult it was and it was well worth it," he said. The dedication of this man spoke volumes not just about how access was made worse after the fire, but about peoples' perseverance and dedication to the Academy.

2 The commitment of everyone who was involved in the aftermath of the fire, especially the staff, was amazing. People were here within minutes, and more came in during the course of the day. There were staff mopping up the mess in Computer Services, and there were volunteers, trustees, and people from all walks of the Academy family who really pitched in.

The fire also meant we lost Earth and Space Hall; the planets melted, the pendulum was disabled, and the Earthquake Theater closed. But we saw a silver lining. We realized this gave us the opportunity to experiment with some of the ideas that we're thinking about for the new

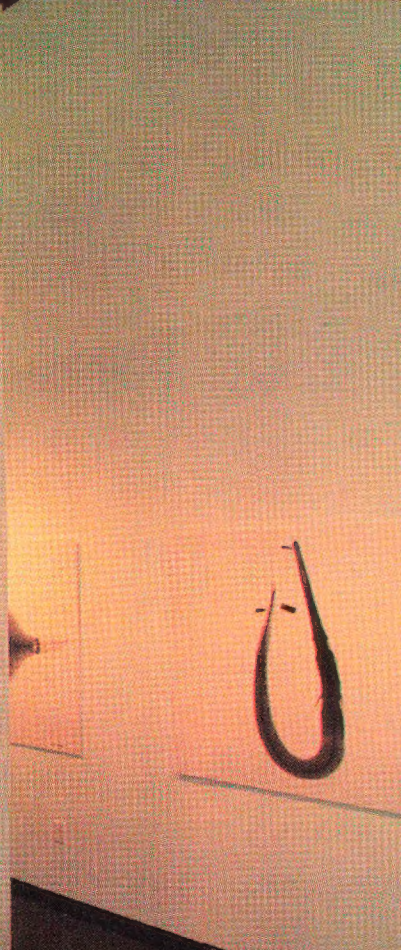
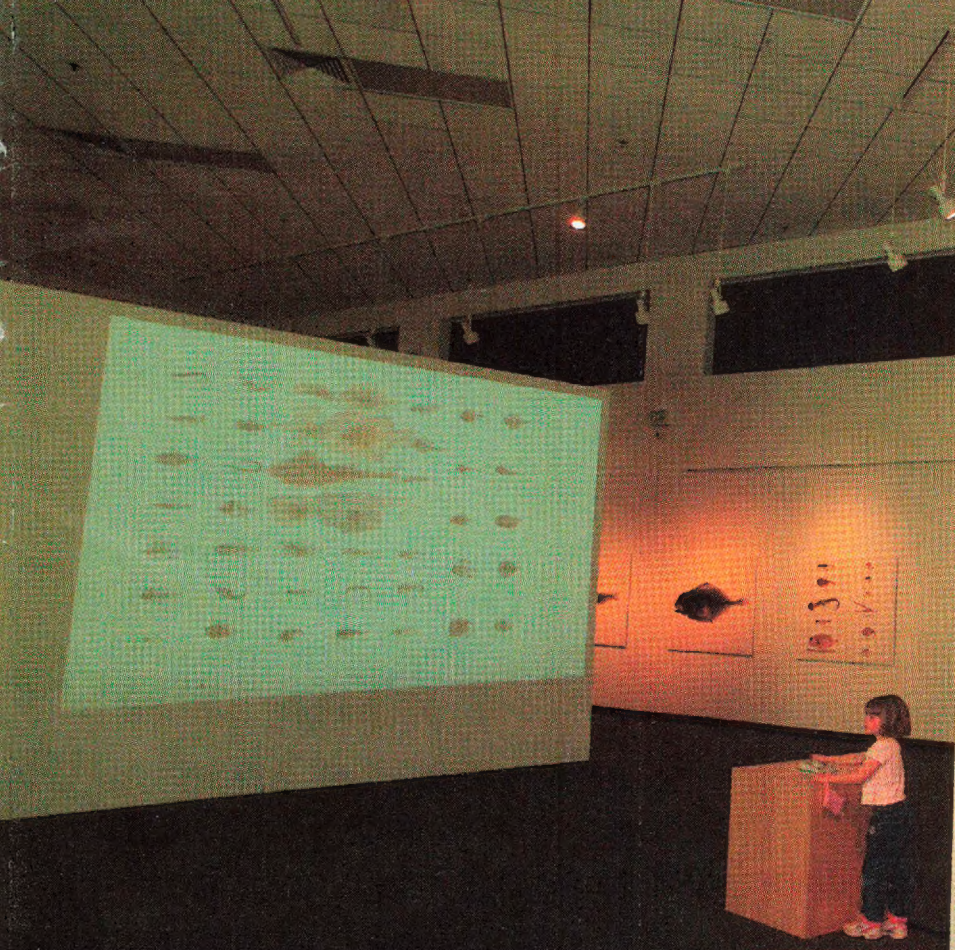
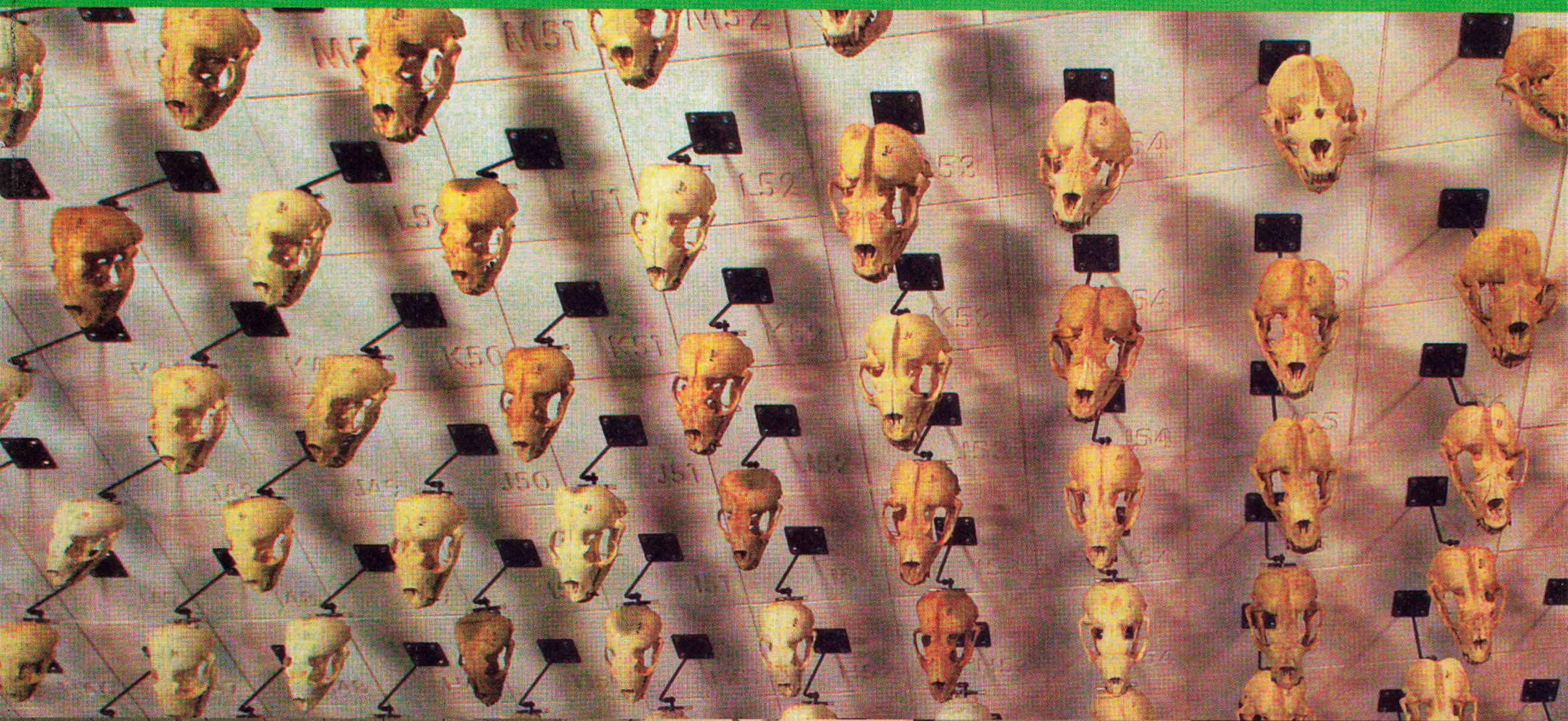
Academy. We decided to quickly get together the "Powers of Ten" and the "Skulls" exhibits. Having a lot of specimens on display, having exhibits that focus on real objects is a goal that we plan to pursue in the transitional space and in the rebuilt Academy. In this virtual age, having real things is one of our unique assets, and we want to make sure that the public understands the value of that asset. Our specimens of fauna are records of how individuals and species lived and died. When you look at that wall of sea lion skulls collected by Academy Associate Ray Bandar, you discover each one of them has its own story about the health of that organism. There is evidence of how it lived and how it met its death, sometimes due to natural circumstances such as being eaten by a shark, or in some cases due to human activity such as being tangled in fishing nets.

In developing "Skulls" we decided to use an outside designer and produced an exhibit that looked quite different from one we would do internally. It captures the kinds of things that we want to do in the new Academy. It has a little edginess to it. It has a more commercial take and a more industrial look. Yet it's very open. The exhibit is designed so that you can change things out pretty readily. And we have been adding and replacing different specimens. That kind of flexibility and the idea that exhibitry can be moved more readily is a feature we anticipate in the new Academy. Maybe we can tell different stories with some of the same material. The exhibit also looks at how skulls have been used in art and traditional ceremonies, providing a link to human cultures. The interface between art and science is something that we want to explore further. Not only are the specimens themselves subjects of scientific study, but they are also objects of art. We saw through David Liittschwager's book *Skulls* that they can really be beautiful.



Left: Juan-Carlos Solis giving one of many explanatory talks in the "Skulls" exhibit. Right: Every week, different ethnic groups from around the world are invited to demonstrate or display various aspects of their culture including arts, crafts, theater and dance. Here we see Scottish Highland dancers.





Above: A wall of 900 California sea lion skulls—most collected by Associate Ray Bandar—is part of the "Skulls" exhibit. Left: X-Ray Ichthyology Exhibit.

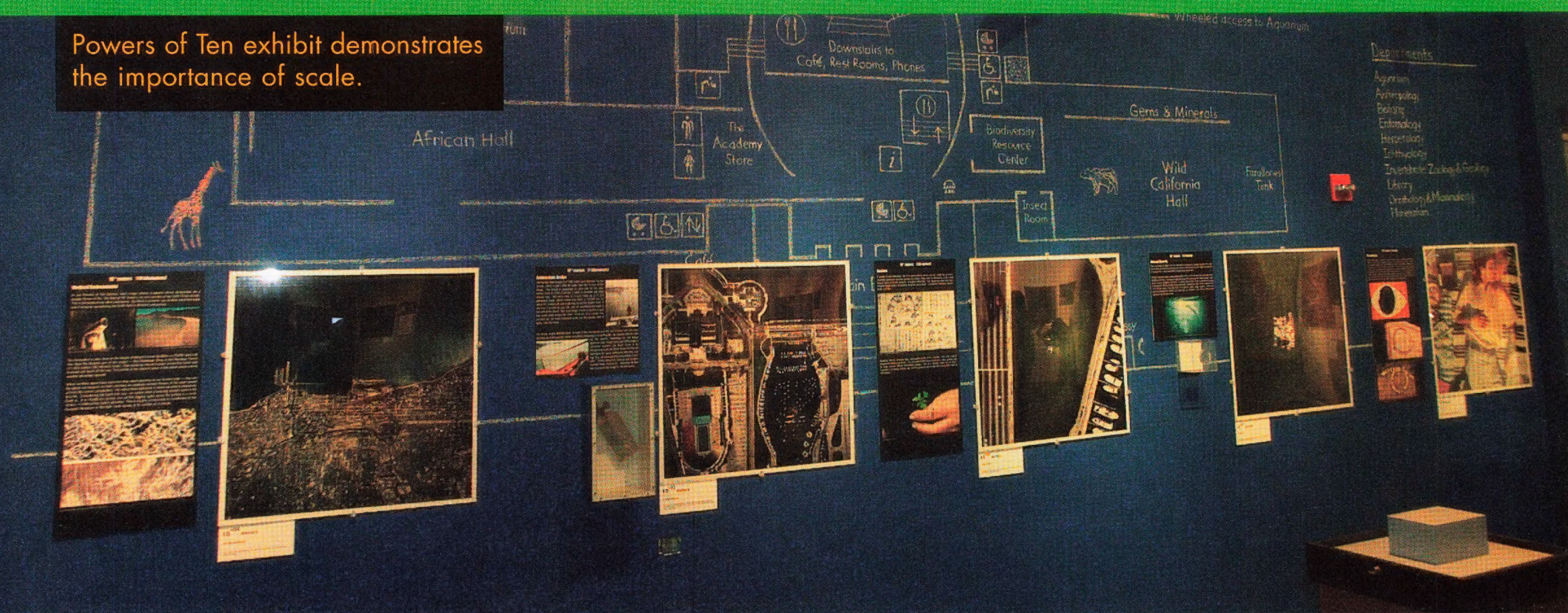
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American cultures celebrated at the Academy. Polynesian dancer celebrates American Asian-Pacific Heritage Month. Dancers acknowledge American Indian Month. West African drummer plays during Black History Month.



Public Programs

Powers of Ten exhibit demonstrates the importance of scale.



Although “Powers of Ten” is an exhibit idea that’s been around a long time, we were able to customize it with a diverse variety of Academy objects. The concepts are universal and generic, but working with Eames Demetrios, the grandson of the original creators, we brought real examples that demonstrate scale, from very large objects, all the way down to sub-microscopic specimens. Using interviews with our scientists we personalized the exhibit and created a very different look to the way the subject has been exhibited elsewhere. Moreover, the topic cuts across every discipline from our studies of microscopic organisms, like diatoms, to the study of the universe by the Planetarium. Scale is something that affects every aspect of science.

“X-Ray Ichthyology” was derived directly from a research project. The Ichthyology Department was funded by the National Science Foundation to take x-rays of its type specimens to provide information to ichthyologists around the world who wanted to study these objects and to do so unintrusively. We no longer have to send out the specimens around the globe. We just put images on the web and the information is instantaneously available to the scientific community.

Executive Director, Patrick Kociolek was looking at those x-rays one day and said, “Those are just beautiful objects. They’re works of art in themselves.” They are really compelling images that show diversity of form and the unique architecture of the skeletal elements. We selected about 50 of our favorite images out of around 1,300, and brought them to an outside designer who turned them around very quickly. Within a matter of

weeks we had an exhibit that very simply explains some of these images and their place in the scientific world. It is basically a study of natural architecture. A purely research project had tremendous implications and impact as a visually stunning exhibition.

We are continuing to plan for the new Academy and to think about how this building is going to reflect the programs we want to be able to deliver. The program will dictate the design. We have a series of goals, some of which we are testing with current exhibits that are linkages between research and education.

We want to make the research function of the institution far more transparent to the visitor, and blur the lines between research, education and exhibits. The vast majority of our traditional audience does not know that this is a world-class research institution in addition to being a public museum. They may have an inkling that’s there’s something behind those doors but they have no idea what it is or why it’s important to them. Bringing more specimens to the public floor is one way of changing that perception.

ScienceNow brings current topics in science, together with our research and educational activities, to the public in a more immediate fashion. Those are all ways in which we want to make the behind-the-scenes aspects more visible. What we learn from those experiences will improve how we will organize the new Academy, how the building should be designed, what kinds of spaces there should be on the public floor, what kinds of interfaces there should be with the research and education facilities, and how we design a building that works better to serve all our audiences.

Science NOW: A Rapid Response Approach

Gail Hewson Hull, Project Manager



ScienceNOW kiosk includes a live aquarium exhibit and three other panels, which are constantly changing to bring science news to the exhibit floor. Right: Golden king crab, a declining species, featured in ScienceNOW.



What is the most important news story in natural sciences this week? Who among Academy curators has published new research or collaborated with national or international colleagues to advance knowledge in biology? Where are Academy scientists in the field on research expeditions? What animal or plant is in the news, under threat, invading native species, or of seasonal importance right now?"

These are some of the questions asked every week by the Science NOW team of seven staff members from six Academy departments as they prepare to roll out a new feature for the kiosk-style exhibit and web pages. Our second anniversary has just passed, and we look back at a long list of 120 features we have covered for our visitors. They are presented in four categories: "Headline Science," "Where in the World," "Academy Research," and "Wild Lives" (featuring a live organism). A computer terminal is part of the exhibit so visitors can access past features and related web links.

Located at the intersection of the Biodiversity Center and the entrance to Wild California in Cowell Hall, the Science NOW exhibit has broken new ground. The team is a unique partnership of talented staff members who have developed a rapid response approach unlike any previously tried at the Academy. What better way to marshal breaking news into attractive and information-packed graphic exhibits (often with accompanying specimens), than to bring together colleagues whose combined skills make the challenge speedy and stimulating? From *CALIFORNIA WILD* comes our science writer; from Steinhart Aquarium, our map maker/illustrator/husbandry liaison; from Exhibits, our graphic designer; from the Academy Library, two

librarians with research and web expertise; from Education, our outreach specialist; and from the Provost's office, our project manager/photo editor.

Academy scientists bring the team up to date on their trials, tribulations and rewards in the field, laboratory, or collections. They are enthusiastic about our mission to transform complicated research issues into concise and provocative learning experiences for the public. We also receive extraordinary cooperation and assistance from scientists around the world. When news media or scientific journals report new discoveries, we contact the authors. The Academy's international reputation stimulates immediate collaboration and the opportunity to provide visitors with deeper insights and unpublished details from original sources.

Did you know that an Academy entomologist discovered a wasplike ant (dubbed "dracula") in Madagascar that could be the missing link in ant evolution? That a bizarre seven-meter-long giant squid was caught on video last year in one of the deepest parts of the oceans? That the Steinhart Aquarium is teaming up with local zoos to detect the arrival of West Nile Virus in the Bay Area? That an Academy-led team of paleontologists has discovered an evolutionary battle unfolding in the Gulf of California between clams and predatory, hole-drilling snails?

This is just a fraction of the important news covered by Science NOW over the past two years. To see the latest features, to review all the stories you may have missed but which are still available on our archive, visit the Science NOW kiosk at the Academy or our web site at http://www.calacademy.org/science_now/.

Research

David Kavanaugh, Director

Most of our effort over the past year has gone into planning for our future in the New Academy and the transition space. We're reevaluating the organizational structure for the research division and our physical needs for collections and research facilities as they expand. We're planning on an initial space to accommodate twenty years of collection growth and a design that will allow for another fifty years of expansion. We anticipate an accelerated phase with more well-qualified scientists coming on board, especially in the growth areas of Botany, Entomology and Invertebrate Zoology, where there are still so many species to discover and describe.

Among the Research Division's goals decided upon at a recent retreat were: to encourage collaborative research among the different departments through multi-disciplinary expeditions; to become more involved in training the next generation of systematic biologists, both at the Academy and at local universities, and in other countries; and to increase the number and significance of our scientific publications. Over the last twelve months, the Academy has shown significant advances in all these areas.

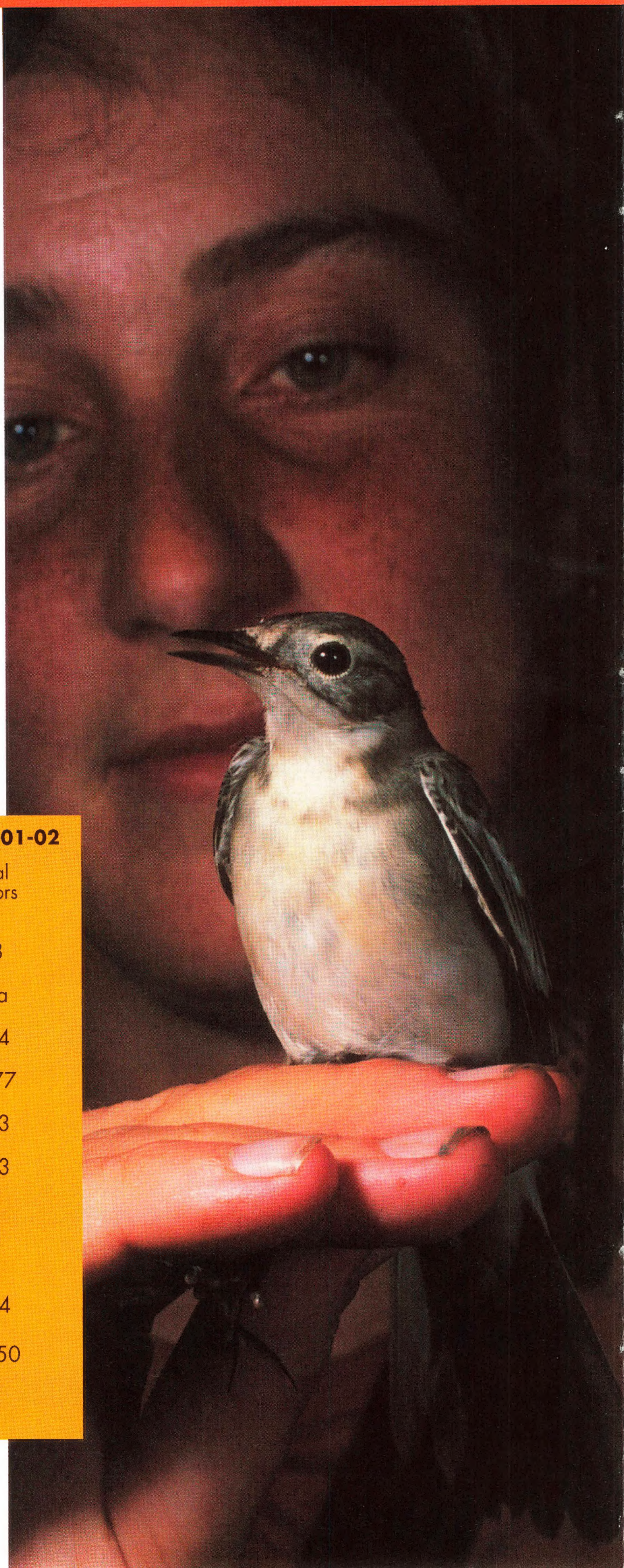
The first multi-disciplinary expedition to Myanmar (Burma) was marred by the untimely death in the field of its leader, Dr. Joseph Slowinski. He was a talented scientist

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Growth & Use of Collections in Research Departments 2001-02

Department	Total specimens accessioned	Total specimens loaned	Total visitors
Anthropology	6	64	38
Aquatic Biology	n/a	n/a	n/a
Botany	19,550	2,490	434
Entomology	212,294	71,091	1077
Herpetology	4,490	1,597	113
Ichthyology	3,253	4,129	123
Invertebrate Zoology & Geology	258,528	1,014	71
Ornithology & Mammalogy	1,708	1,757	694
Totals	499,823	83,095	2,550

Total Holdings in All Collections 17,181,189





Opposite: Maureen Flannery in Myanmar with citrine wagtail. Left: Ant specialists Brian Fisher and E.O. Wilson. Below: Academy, Chinese, and Burmese scientists on an expedition to northern Myanmar. Overleaf: Ant collected from Madagascar.



whose life was cut far too short. The work that he initiated continues under Dr. Al Leviton's direction, and Joe's legacy continues. Although this expedition focused on the fauna and flora in Kachin State in northwestern part of the country, the project, funded mainly by the National Science Foundation (NSF), aims to inventory the reptiles and amphibians throughout Myanmar and, equally importantly, to help develop the research capability within the country. Members of the Burmese field team will be coming to the Academy for on-site training. Meanwhile, other members of the Herpetology Department have returned to Myanmar to maintain our links with the Department of Forestry there.

The Academy's satellite research support facility in Madagascar's capital, Antananarivo, serves as a sorting center for insect and spider materials coming in from the survey that Drs. Charles Griswold and Brian Fisher are conducting of the island's fauna. Incredible numbers of new species are being found and a distinct pattern of faunal turnover of invertebrate species is emerging. Although many of the birds in Madagascar are endemic, there are only 380 species (California has over twice that), and the whole eastern forest, for example, may be home to the same species of birds. At the arthropod level, numerous pieces of that forest are unique, representing distinct centers of endemism. That's probably the most profound message that's coming out of this research. As in Myanmar, our most useful contribution to the future of Madagascar's fauna and flora and its people is to share our knowledge and our enthusiasm; but both the long-term results of this program and the fate of the biota are in the hands of the Malagasy people.

This last year we received a \$2.4 million grant from the NSF to fund our cooperative work with the Kunming Institutes of Botany and Zoology, Hunan Normal University, Edinburgh Royal Botanical Gardens, and the Institute of Zoology in Beijing to further the inventory of the Gaoligong Mountains in western Yunnan. We all met in Kunming in April to work out a sampling schedule, plan for working cooperatively, and decide what media would be used to disseminate the results of the research. Plans for a large-scale expedition later in 2002 were finalized. Once again, the most critical element of this venture is the sharing of knowledge and expertise with local researchers, who are eager to be trained in the western tradition of



systematics and study of biodiversity.

Dr. John McCosker spent time in the Galápagos Islands assisting Ecuadorian scientists to compile a marine management plan. Academy President Dr. John Pearse and (later) Dr. Richard Mooi traveled on a NOAA ship to Antarctica sampling marine invertebrates along the coast.

Drs. Peter Fritsch and Frank Almeda worked in Brazil on another NSF-supported project on the genus *Symplocos*. Brian Fisher led an expedition supported by World Wildlife Fund to inventory the fauna of the Central African Republic. Primatologist Dr. Nina Jablonski worked in Kenya with Meave Leakey on the fossil primate fauna of the Turkana Basin. Closer to home, the SFBay2K project entered its most active period, with the Academy's vessel *Lucille* taking researchers out to sample the Bay's benthic fauna. Much of the sampling also takes place from shore, where teachers can bring whole classes for hands-on experiences with science.

Our intern programs are still going strong. During the year, we received continued NSF support for the Summer Systematic Institute, and seven students came from six different universities to take advantage of the program. Over the last three years, the number of graduate students supervised by Academy scientists, through joint programs at San Francisco State and Stanford universities and at the University of California at Santa Cruz, has risen from zero to twenty-four. We also were awarded the largest total of NSF research grant dollars ever received by the Academy in a single year—more than \$2.5 million.

Our submissions to science publications, including electronic publications, have also increased, especially the number of papers being accepted by high profile journals such as *Science*, *Nature*, and *Evolution*. The impact of our publications, as measured by numbers of citations, has also increased. And the number of multidisciplinary, collaborative projects has increased dramatically, with thirty-two staff members involved in such projects during the year.

The Academy's website now receives four million hits a month. Many cyber-visitors come to one of the Library's many web pages, including those for the Manzanita Project, our digital photographic library, the Biodiversity Resource Center, which answers natural history questions, and the children's page, where we help to encourage the youngest members of our society toward a fascination with science.

This last year again saw alarming news about the state of science education in California and the nation. Less than 25 percent of U.S. elementary teachers have formal training in the sciences, California's 4th and 8th graders rank at the bottom on standardized national science tests; and the American public feels an increasing disconnection from science. In recognition of the importance and impact of our educational programs, the Academy reorganized the department into a new Education Division in September 2001. In both the transitional Academy and the new Academy our programs will play an increasingly important role in the Bay Area's formal and informal education systems. This year, for example, Carol Tang, assistant chair of education, provided earth science training to all middle school teachers in the San Francisco Unified School district. Here are some of the other program highlights from this past year.

BioForum brought over 400 educators from 17 Northern California counties to attend the 17th annual BioForum series which focused on California's Endangered Species and Biodiversity Hotspots, The "Science" in the Energy Crisis, and Astrobiology: The Living Universe. A teacher commented, "BioForum keeps me apprised of new technology in science and also gives me a chance to talk to other science teachers...very informative, lots of information that I can take back to the classroom."

—Lorie Topinka

Careers in Science, the Academy's year-round high school and undergraduate intern and research program, continues to provide real work and science experience to students typically underrepresented in the sciences and

education. From March-June, interns interviewed 113 applicants and selected 11 new interns from 9 Bay Area schools. All of the program's graduates began studies at two- or four-year colleges. In addition to making college tours and local museum visits, interns contributed to numerous fairs and festivals, conferences, and high school and community outreach events.

—Ashley Conrad-Saydah

The **Docent Program** has approximately 200 active docents, highly trained volunteers who provide tours to school groups and the public throughout the exhibits. Docents annually give 400-450 tours for school groups, grades 3-12, reaching over 13,000 students. Docents also staff hands-on demonstration carts, provide Tide Pool interpretation, and participate in Wild City! Outreach. Each year we sponsor two special days specifically for homeschool, and last year we reached over 900 homeschoolers. The docent program also made reservations for over 725 school groups representing over 23,000 students.

—Kathleen Lilienthal

Early Childhood: The Africa Experience is a great place for families with children of different ages. While older children tour African Hall via the computer station or use African animal puppets to put on a show for their families, preschool children and infants enjoy African instruments, costumes, and books in the Africa Playspace. Said one parent of a toddler, "Whether he learns something new each visit or not, coming to the museum has become a normal thing to do, not just saved for special occasions".

—Celeste Argel



Graduate assistant Chris Brown with a group of teachers during a lab session, part of the SFBay2K program which is inventorying San Francisco Bay. Right: Intern Naaman Ho explain freshwater organisms to an Academy visitor.



Education Program Attendance

Bioforum/teacher workshops	720
Junior Academy (school year)	394
Camp Academy (summer)	166
Adult and Family Courses	2,145
Outreach	1,201
Lectures	6,605
Docent tours	16,567
Early Childhood Play Space	149,500
Touch Tidepool Interpretation	196,000

The **Lecture Program** provides stimulating forums for the public to listen to and take part in dialogues with scientists, science writers, educators and artists on vital environmental and scientific issues. These events usually focus on a timely research topic, complement a special exhibition, or coincide with the publication of a new book. Besides Members' Lectures and Special Lectures, the program included the Leakey Speaker Series on Human Origins and Conversations at the Herbst Theatre. Among the speakers last year were writers Peter Matthiessen, Gretel Ehrlich, and Tony Hillerman, and biologist E.O. Wilson, the leading spokesperson in the world for the need to preserve biodiversity.

The Human Genome Human Being Symposium featured an international panel of science, communication, theology, and ethics experts discussing the implications of genetic manipulation. The all-day event gave the public a unique opportunity to participate in and witness a debate of profound significance.

—Kevin Welch

The **Mountain Lake Research Project** is a long-term, field-based, biodiversity education project that enables middle school, high school and college undergraduate students to be a part of the restoration efforts currently underway at Mountain Lake. Collaborating with the Presidio Trust, National Park Service, and the Golden Gate National Park Association, the project gives students the opportunity to track changes in the lake ecosystem. Students monitored water quality, zooplankton, birds, and reptiles around the lake and presented their data at the Second Annual Mountain Lake Symposium held at the Academy.

—Jeff Dorman

The **Outreach Program** continues to grow and deliver programming to local schools and recreation centers. Wild City! finished its third year, working with 700 4th and 5th grade students traditionally underrepresented in the sciences. Our Wild Summer! field-based program, also in its third year, explored San Francisco's natural areas with 3rd to 5th grades kids also from underrepresented groups. This year our partners included Bayview YMCA, Presidio YMCA, Sunnyside Playground, Mission Recreation Center, and Treasure Island Boys and Girls Club.

Our new After-school and Community Outreach programs brought aquarium animals and other specimens to San Francisco students. Working closely with the Academy's Marketing Department, Education staff and interns also represented the Academy at many local fairs and festivals.

—Margaret Feldmann

The **San Francisco Bay: 2K Project** is a long-term survey of the bottom-dwelling fauna in San Francisco Bay. There is a strong education component to this biological



monitoring initiative, introducing Bay Area high school teachers and students to the process of scientific discovery, involving them directly in specimen collection, identification, and data analysis.

—Roberta Ayres

Volunteer Services lets people fulfill their dreams. Whether it is diving in the Roundabout, teaching an inspired group of children, or reawakening an early interest in biology, the Academy offers opportunities for avocation with fulfillment. New recruits often affectionately remember a visit to the Academy as a child as the catalyst for their continued interest. “I’ve always loved this place” is the most frequently heard comment from volunteers young and old.

—Rosalind Henning

Our **Youth & Adult Courses** continued to help people of all ages explore and understand the natural world through diverse classes, camps, field trips, and workshops for kids, families, and adults. Family activities were especially popular last year, providing opportunities for children and parents to discover nature hikes, tidepooling, bird-watching walks, whale-watching, stargazing, and nature art and crafts.

New this year were overnight camping trips for families, including some at the Academy’s Pepperwood Preserve. “This was a superb experience,” one parent said. “Great for the kids—they loved it.” Another remarked, “A safe, first camping trip with my 6-year-old at beautiful Pepperwood in springtime.”

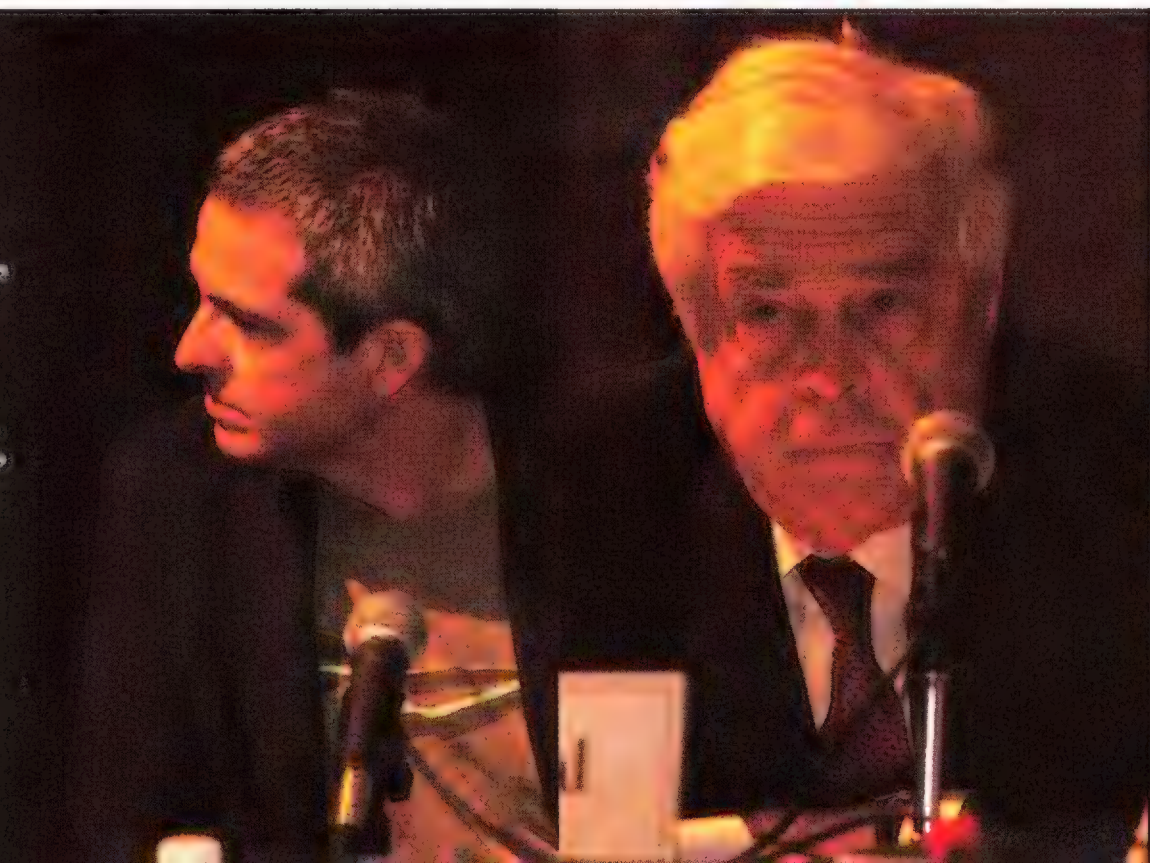
—Leslie Quillin



Above: Casting a zooplankton net into Mountain Lake in San Francisco’s Presidio. The Mountain Lake Research Project is a long-term program to monitor the lake and surrounding habitat. Below: Margaret Feldmann introduces children in the Outreach Program to a Madagascar hissing cockroach.

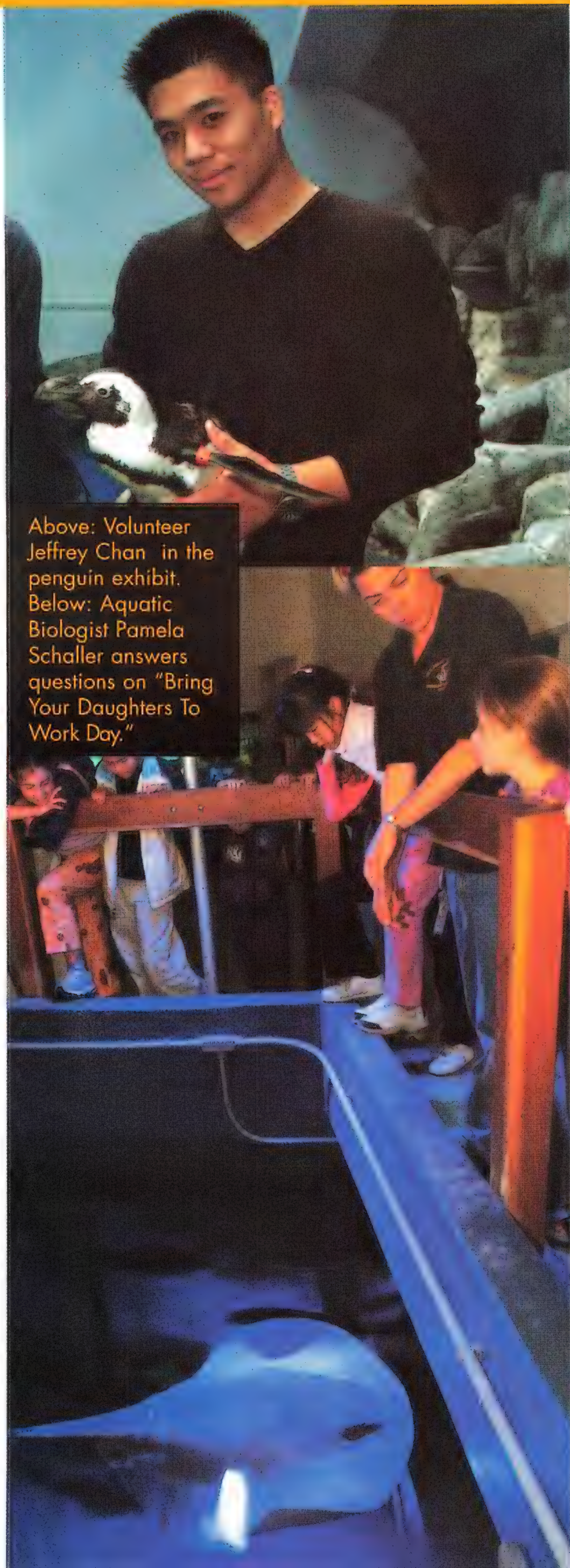


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Speakers at the Human Genome Human Being Symposium. Left to right: Dr. Rodney Brooks, MIT Artificial Intelligence Lab; Dr. Robert Lanza, Advanced Cell Technology; Dr. Nina Jablonski, California Academy of Sciences; Kirby Gookin, New York University; Dr. Osman M. Salal, UCLA; Dr. Karma Lekshe Tsomo, University of San Diego.





Above: Volunteer Jeffrey Chan in the penguin exhibit.
Below: Aquatic Biologist Pamela Schaller answers questions on "Bring Your Daughters To Work Day."

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This last year we've all been trying to get everybody familiar with a lot of different jobs. We've got a lot of work coming down the road and we want to have a cohesive unit of people who can do all these tasks. Keeping the place open takes up the majority of our time. Next comes trying to plan for the transition and the new Academy.

Still, we like to ring the changes every 18 months or so and we have changed the tropical room panel over from African fish to Southeast Asian fish.

The coral reef continues to develop, but because it's not a lot of water for the number of animals, it behaves like an ecosystem out of balance. There's always some chemical adjustment needed. For instance, we have a constant battle keeping enough calcium in the water. After all, we have fast growing coral basically making rock from water. The first generation of clown fishes born back in '98 has grown up and they are laying eggs. We are attempting to raise another generation, the second generation born in captivity.

Our first Steinhart-born Banggai cardinal fish are now on display in the coral reef tank. Last year, we had one actually born in the exhibit. That was exciting to have our first fish recruited in that simulated ecosystem. They are tiny when they're first released, about the size of the brine shrimp that we use for feeding, so they usually get eaten. This one happened to get down into a coral where the stinging cells protected it. We've all been watching that one little fish.

One conservation project that I have been involved in is the Lake Victoria Cichlid Species Survival Plan. It's a group project with 19 species at 18 different institutions organized through the AZA. Lake Victoria cichlids have become highly endangered, and we are a repository for one of the species (*Haplochromis*). It's not scientifically identified, but it's known as "two stripe white lip." We are the only institution keeping that species which is presumed to be extinct in the wild. We would love to breed them but that is proving difficult. They're super aggressive and so when we try to pair them up the males just beat up the females.

We have a tremendous collection of freshwater fishes and aquatic plants. Plants don't tend to do well in our large systems. But today, our smaller displays have thriving plants, thanks to back of house growing tanks that have a separate life support system with their own filtration unit. These systems are fairly hi-tech with injected carbon dioxide, high intensity lighting, specialized filtration, and chemical supplementation. Once the plants are established they are pruned and the cuttings used in displays.

Aquarium At A Glance 2001-02

Size of collections:	6,000 specimens of 621 species.
Research/ breeding projects underway:	25
Student visitor/ visiting scientists:	850
Volunteers:	40 for 2,700 hrs.
Seminars, lectures, and presentations:	60

Frank Glennon is breeding all kinds of fish species, including desert pupfish. We raise the fry and trade them with other aquariums and pet stores to get new stock for our displays. We'll also keep some to use for future display. Pike

Ken Howell and I are responsible for the care and maintenance of the Swamp area, including all the reptiles, amphibians and the fresh water invertebrates. We are also responsible for the fresh water components and terrestrial components in Life Through Time. A lot of the newts and salamanders, including the Spanish ribbed newt, the gold-dust newt, and even the California newt, have been breeding. We have had several generations born here. They seem to have found the public display environment we've created particularly conducive to reproduction. This is quite special; it's lovely to find new larvae in the tank. The apple snails have been reproducing readily as well.

We have changed a few exhibits around the Swamp, including adding western fence lizards, and have given a fresh new look to the snake panel with more live plants to give them a more natural environment.

We have acquired a panther chameleon, though it is not yet on display. He's been named Luigi but I call him Buddy. We want to see if we can develop techniques for maintaining chameleons in the new aquarium. They are difficult to care for, easily stressed and require very specific

Architectural details from the Steinhart Aquarium. Left to right: Cast bronze turtle door handles; Pillar capital in The Swamp; Walrus on the courtyard wall.

Steinhart Aquarium

live-bearers are one example. They're a prohibited fish in California but we have a special permit to display them.

We serve as a constant repository for illegal animals seized by California Fish and Game. We frequently receive snakehead and freshwater stingray. Let loose in California they could destroy our native fish populations. The stingrays and the snakeheads are now on display. We also get the endangered Asian arowana as trade in them is forbidden.

—Bart Shepherd

temperature and environmental needs. Each species is quite different so you have to watch them carefully. They communicate by posturing and color displays. It's been fascinating learning their language.

The giant Chinese salamander outgrew its tank in Life Through Time. We have axolotls in its place—that's a salamander that never outgrows its larval stage. Now we have three giant salamanders awaiting bigger tanks in the new Aquarium.

One unusual discovery came after a White's tree frog developed lipid keratosis in its eye. It usually continues to get worse, but we made a slight change in its diet and it pretty much cleared up. That was a nice surprise.

Meanwhile the need for maintenance grows exponentially. Recently we experienced flooding from cracks in the ceiling, particularly in the venomous snake holding room. We all have

to keep an eye open for flaking paint, which could be toxic to the animals, and cracking concrete. We no longer drain the tanks directly on the floor. Instead we have the cumbersome task of transferring the water in buckets. Fortunately, there's light at the end of the tunnel.

—Angela Pettitt



Morrison Planetarium

Kirsten Vanstone

In this busy and challenging year, the Planetarium explored themes ranging from dark to light, from nearby meteors to the large-scale forces of the Universe. "Dark Matters" considered things that we cannot see such as black holes and dark matter. Astrobiology was the central topic in "The Living Universe," brought back by popular demand in the fall. December saw the fiftieth return of the annual holiday show, "The Christmas Star." "2002 Almanac" looked ahead to the celestial events of the upcoming year and "Stargazer's Guide to the Galaxy" took

audiences on a tour of the Milky Way. The third and fourth grade school show, "New Worlds," was re-worked to better fit the new California science curriculum. All shows benefited from new techniques of producing computer-animated sequences in-house.

During the Fall, the monthly Dean Lecture series probed "The Dark Side of the Universe." Michael Turner, Mario Livio, Neta Bahcall, Gia Dvali and Alexander Vilenkin presented ideas from the cutting edge of theoretical astrophysics and introduced audiences

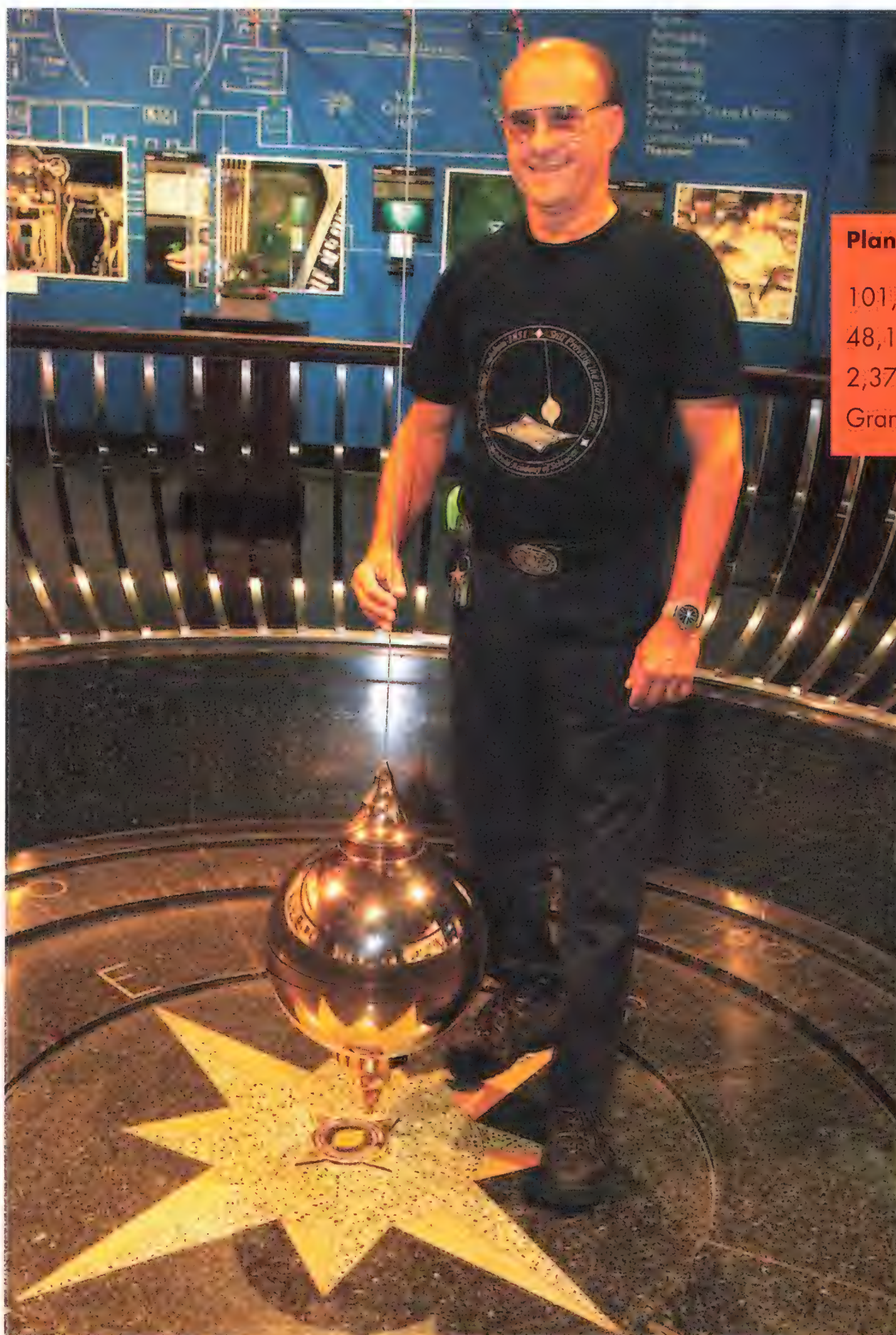
to a Universe that is not just expanding, but actually accelerating its expansion, pushed by a mysterious force called "dark energy." This challenging series was very well received.

Planetarium Visitors

101,563 attended 924 public sky shows
48,170 reserved for 234 school shows
2,373 attended 10 Dean Lectures
Grand total: 152,106 Planetarium visitors.

The Lectures took a lighter turn in the Spring with "The Multi-Colored Sky." Jack Welch, Michael Bicay, Harvey Tananbaum and Valerie Connaughton helped us look at the Universe using all types of electromagnetic radiation, from radio waves to gamma rays. A highlight of this series was Space Telescope Science Institute Director, Steve Beckwith, who made exciting predictions about the future of astronomical research and the use of telescopes in space. Tinka Ross continues as the Dean series coordinator to the grateful appreciation of both the Planetarium staff and lecture audiences.

In addition to the usual program of shows and lectures, the Planetarium gave a special show for the Darwin's Birthday event as well as four concerts under the stars.





Opposite: Cary Ponchione restarts the Foucault Pendulum after repair of the August 2001 fire damage to Earth & Space Hall.
Above: Whirlpool Galaxy from "Stargazer's Guide to the Galaxy."

These featured music from Cuba, Vietnam, Baroque Europe and even Berkeley! During the post-fire period, the Planetarium hosted many Academy events while the Auditorium was being repaired, including Members' Lectures, Bio Forum, and the Luis Baptista "Symposium Nature's Music: The Science of Birdsong." Planetarium staff lent their expertise and equipment in the construction of the Powers of Ten exhibit as well as coordinating the re-design of the Planetarium entry and ticket booth.

Following some needed repairs to the roof of the Hume Observatory at the Academy's Pepperwood Ranch in

Sonoma County, several astronomical programs ran there, including a community night. There was a lot to look at in the sky this year, including a "blue" moon on Halloween and a tight planetary grouping during evening twilight in the spring. The year's celestial highlight was the Leonid Meteor storm in November. This event generated a lot of public and media enquiries, which kept the staff busy. No one who saw the shower was disappointed. At the peak of the meteor storm, Planetarium astronomers counted six meteors in one second. And a class of students was on hand to share the experience.

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As the Academy's Chairman from 1993 through 1997, William Kimball has been integral to Academy success. He has served on the Executive, Trustees, Development, Finance, Friends and Proprietary Products Committees, and founded the Academy Council, an Academy community advisory group. For over twenty years he has worked with grace and resolve to strengthen this institution.

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The Academy of Sciences has been an important part of my life since I was a small child. Growing up in San Francisco in the 40s, I fondly remember the large "tank" in the courtyard that held seals playing all day. I loved the Aquarium, not only for its wondrous diversity of species on display, but also for its mysterious beauty. When I was in my twenties a friend asked me if I wanted to participate in

fish-collecting expeditions as a Steinhart Diver. These trips became the highlight of my life as a young adult. Naturally, I wanted to become a docent and enjoyed several years of touring school groups around the Academy. When my own children were small and it was cold and foggy outside, our favorite retreat was the Academy. It was clean, safe, spacious and fascinating. My husband and I have been on several Academy trips and consider

them a guaranteed ticket to education and adventure.

As a trustee, I've gained a new appreciation for the research that's done in the Academy's laboratories and in the field, the fabulous Camp Academy in the summer, the great classes and, now, the hard work, thoughtfulness, and creativity that's going into the plans for the New Academy.

—Tania W. Stepanian

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 John Stuart Pearse, *Invertebrate Zoology*
 William B. Peck, *Arachnology*
 Donald W. Peterson, *Geology*
 Edwin Philip Pister, *Conservation Biology*
 Karl S. Pister, *Civil Engineering and Education*
 Galen B. Rathbun, *Mammalogy*
 David Rentz, *Entomology*
 S. Dillon Ripley, *Zoology*
 Peter Rodman, *Anthropology*
 José Sarukhán, *Botany*
 Evert I. Schlinger, *Entomology*
 Jacqueline Schonewald, *Mammalogy*
 Harvey I. Scudder, *Entomology*
 Howard S. Shellhammer, *Mammalogy*
 Norman J. Silberling, *Geology*
 Paul C. Silva, *Botany*
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 Michael E. Soulé, *Evolutionary and Conservation Biology*
 Ignacio Tinoco, *Chemistry*
 Maoli Tu, *Herpetology*
 Tjeerd H. van An del, *Geology*
 Blair Van Valkenburgh, *Vertebrate Paleontology*
 Robert E. Wallace, *Geology*
 Robert K. Wayne, *Molecular Systematics*
 Harold F. Weaver, *Astronomy*
 Cherie Whetzel, *Botany*
 Jack A. Wolfe, *Geology*
 Richard N. Zare, *Chemistry*
 Ermi Zhao, *Herpetology*
 Elwood C. Zimmerman, *Entomology*

EDUCATION DIVISION

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Left: Book Cover *The First Americans: The Pleistocene Colonization of the New World*, edited by Nina Jablonski. Center: Brian Fisher and the ant research lab in Entomology Far right: Botany Senior Curator, Frank Almeda



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skulls

BY DAVID LIITTSCHWAGER & THE CALIFORNIA ACADEMY OF SCIENCES



Right: Ichthyology Curator, Tomio Iwamoto

Far right: Illustration from a publication on the migid spiders of Madagascar by Charles Griswold

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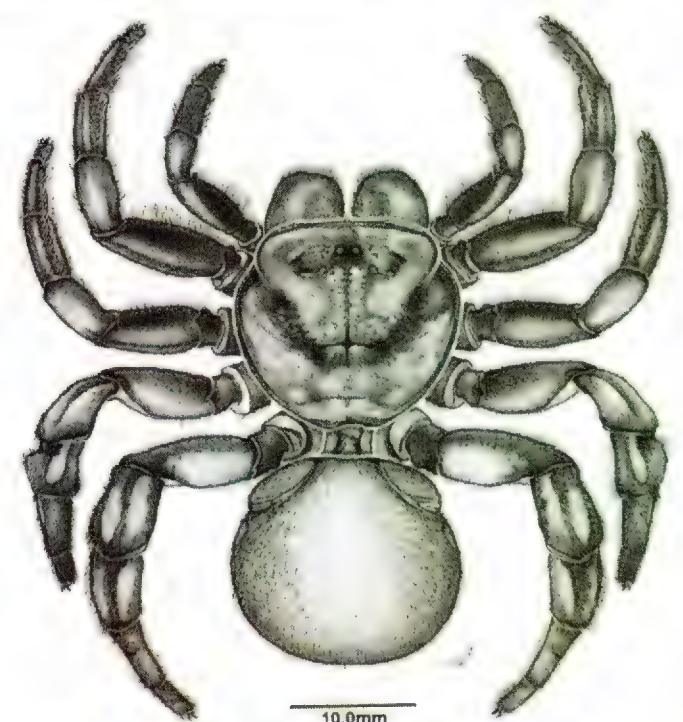


FIGURE 57. *Thyropeus mirandus*, female holotype, dorsal. Illustration by JS

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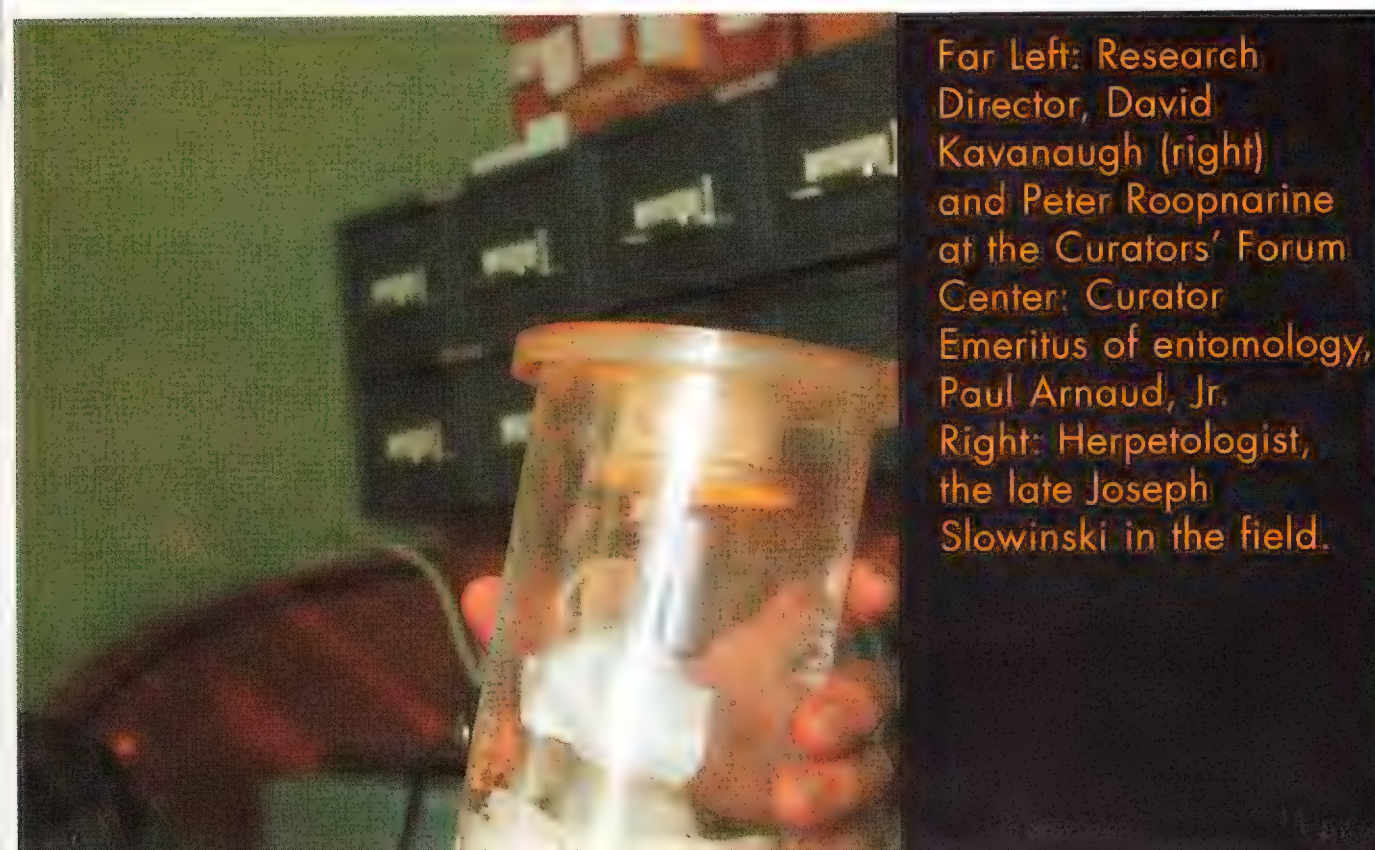
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Far Left: Research Director, David Kavanaugh (right) and Peter Roopnarine at the Curators' Forum Center; Curator Emeritus of entomology, Paul Arnaud, Jr. Right: Herpetologist, the late Joseph Slowinski in the field.



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31



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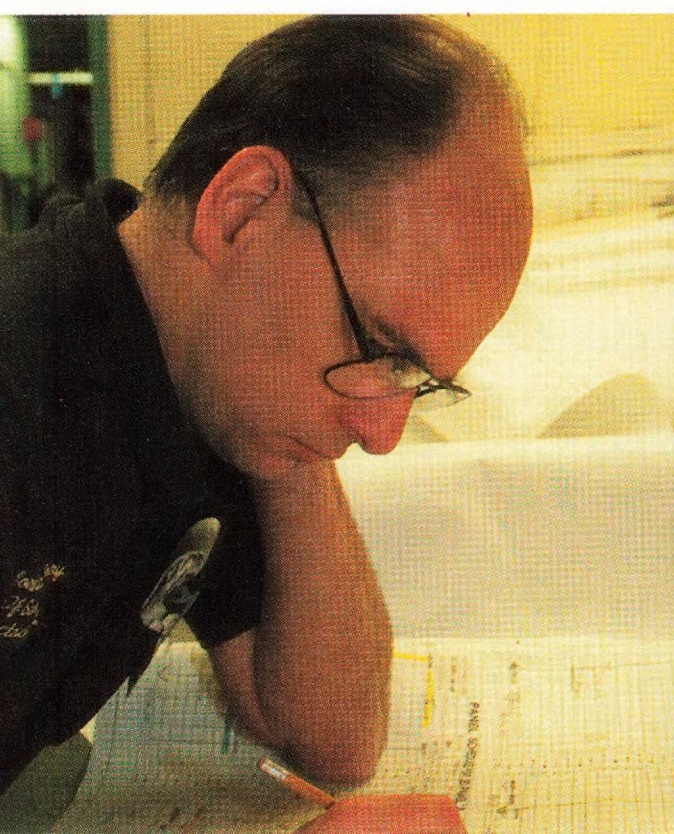
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Far left: Executive Director Patrick Koliolek with a class of docents;
Left: Electrical Supervisor Dan Langlands;
Right: Lectures Manager Kevin Welch celebrates Darwin's Birthday.



Balance Sheet

Total All Funds

Assets	Operating	Plant	Endowment	2002	2001
Cash & Equivalents	124,688	15,786	-	140,474	693,898
Investments in Marketable Securities	1,929,581	45,144,304	128,887,386	175,961,271	187,830,439
Receivables:					
Research Grants	175,597	-	-	175,597	215,198
Other Grants	82,913	944,600	-	1,027,513	981,078
Interest & Dividends	573,729	800,826	-	1,374,555	1,461,076
Other	98,289	1,368,823	-	1,467,112	96,756
Contributions	127,000	1,673,265	400,000	2,200,265	519,864
Due (to) from other funds	(305,940)	(796,589)	1,102,529		
Inventory	484,593	-	-	484,593	359,152
Prepaid Expenses	690,342	2,112	-	692,454	344,210
Investments Held in Trust	-	-	4,129,389	4,129,389	4,478,555
Property & Equipment at cost, less Accumulated Depreciation	-	42,917,644	-	42,917,644	40,787,494
Total Assets	3,980,792	92,070,771	134,519,304	230,570,867	237,767,720
Liabilities & Net Assets					
Accounts Payable	822,998	-	-	822,998	853,072
Accrued Expenses & Other Liabilities	747,208	803,800	63,118	1,614,126	1,474,013
Deferred Income	150,584	-	-	150,584	199,310
Annuities Payable	-	-	1,538,007	1,538,007	1,839,370
Total Liabilities	1,720,790	803,800	1,601,125	4,125,715	4,365,765
Unrestricted Net Assets					
Available for Operations	384,448	6,790,297	10,800,000	17,974,745	10,076,426
Designated for Long-Term	-	42,917,644	-	42,917,644	40,787,494
Designated for Endowment	-	-	93,792,913	93,792,913	111,687,504
Total Unrestricted	384,448	49,707,941	104,592,913	154,685,302	162,551,424
Temporarily Restricted Net Assets	1,875,554	41,559,030	2,005,386	45,439,970	45,092,353
Permanently Restricted Net Assets	-	-	26,319,880	26,319,880	25,758,178
Total Net Assets	2,260,002	91,266,971	132,918,179	226,445,152	233,401,955
Total Liabilities & Net Assets	3,980,792	92,070,771	134,519,304	230,570,867	237,767,720

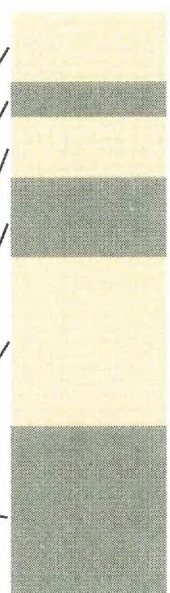
Statement of Activities

Years Ended June 30, 2002 and 2001

Changes in Net Assets	Operating	Plant	Endowment	2002	2001
Revenue & Gains					
Admissions	2,441,104	-	-	2,441,104	2,866,659
Contributions	4,146,912	6,886,495	2,138,498	13,171,905	13,710,893
Memberships	1,005,444	-	-	1,005,444	1,009,342
Tuition & Program Fees	756,207	-	-	756,207	895,616
Auxiliary Activities	1,272,537	-	-	1,272,537	1,714,614
Government Grant Income	1,040,919	9,446,000	-	10,486,919	4,712,494
City & County of San Francisco	2,287,158	-	-	2,287,158	2,200,388
Investment Income	158,690	1,169,518	3,249,872	4,578,080	5,645,063
Net Realized and Unrealized Gains on Long-Term Investments	(147,659)	126,893	(10,781,681)	(10,802,447)	(2,907,000)
Net Insurance Proceeds	638,177	47,841		686,018	
Total Revenue & Gains	13,599,489	17,676,747	(5,393,311)	25,882,925	29,848,069
Expenses					
Research	7,209,000	2,743,145	-	9,952,145	7,280,004
Public Programs	6,843,960	2,868,545	-	9,712,505	6,605,595
Aquarium	3,504,684	1,591,024	-	5,095,708	3,667,624
Development & Membership	2,289,393	713,336	-	3,002,729	2,825,340
Auxiliary Activities	1,402,126	305,665	-	1,707,791	1,551,240
Management & General	2,567,880	800,970	-	3,368,850	2,775,595
Total Expense	23,817,043	9,022,685		32,839,728	24,705,398
Transfers Between Funds					
Capital Expenditures	(323,909)	323,909	-	-	-
Other Transfers	10,951,889		(10,951,889)	-	-
Increase/(Decrease) in Net Assets	410,426	8,977,971	(16,345,200)	(6,956,803)	5,142,671
Net Assets Beginning of Year	1,849,576	82,289,000	149,263,379	233,401,955	228,259,284
Net Assets End of Year	2,260,002	91,266,971	132,918,179	226,445,152	233,401,955


Operating Expenses: \$23.8 million

	\$ Millions	Percent
Management & General	\$2.6	10.9%
Auxiliary Activities	1.4	5.9%
Development & Membership	2.3	9.7%
Aquarium	3.5	14.7%
Public Programs	6.8	28.6%
Research	7.2	30.3%
	\$23.8	100.0



Operating Revenue & Transfer: \$24.6 million

	\$ Millions	Percent
Admissions	\$2.4	9.8%
Contributions	4.2	17.1%
Memberships	1.0	4.1%
Tuition & Program Fees	0.8	3.3%
Auxiliary Activities	1.3	5.3%
Government	3.3	13.4%
Investment & Endowment Transfer	11.6	47.2%
	\$24.6	100.0



Acknowledgments

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IFC, Renzo Piano: Charlotte Fiorito

Pg 2-3: dancers: Jenny Michaels

Pg 7: Burma expedition, scientists: Hla Tun

Pg 9: SFBay2K program: Roberta Ayres;

Intern: Alondra Blandon

Pg 11: Mountain Lake: Joe Kinyon;

Margaret Feldmann: Jennifer Chu

Pg 15: Galaxy: Morrison Planetarium

Pg 20-21 Run to the Far Side: Charlotte Fiorito

Pg 30-32: Docents: courtesy/Docent Program

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